



U.S. Department
of Transportation
**Federal Aviation
Administration**

Memorandum

Subject: ACTION: Interim Policy Guidance for Certification of In-Flight Entertainment Systems on Title 14 CFR Part 25 Aircraft

Date: September 18, 2000

From: Manager, Transport Airplane Directorate, ANM-100

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This memorandum provides guidance, in addition to existing policy and guidance material, to be used during the certification of in-flight entertainment (IFE) systems (also known as passenger entertainment systems, or PES) on Title 14 *Code of Federal Regulations* (CFR) Part 25 aircraft. The results of a recently completed special certification review (SCR) of an IFE system and recent reviews of IFE systems certified by supplemental type certificate (STC) indicate a wide variation in the type of design approvals granted, level of FAA involvement in the approvals, understanding of applicable airworthiness regulations, and the quality and comprehensiveness of data that is used in showing compliance with applicable 14 CFR part 25 regulations. The guidance contained in this memorandum is effective immediately and is to be used for new and amended type certificates and STCs until IFE certification policy, now being developed, is finalized.

This interim memorandum will help ensure a more standardized approach in IFE certification independent of Aircraft Certification Office (ACO) or designated alteration station (DAS) geographical location.

Several unsafe conditions were identified as a result of the STC reviews and mandatory corrective actions are being prepared to address them. These conditions can be summarized as follows:

- the inability to load shed the electrical bus supplying IFE system power without removing power from systems that are required for continued safe flight and landing,

- the inability to remove IFE system power, when required, other than by pulling the IFE system circuit breakers, (i.e., there is no switch dedicated to the IFE system or combination of systems for the purpose of removing power), and
- crew (flightcrew and cabin crew) procedures have not been properly revised to address removal of power from the IFE system

In order to prevent the same types of designs from obtaining future FAA approval, the following certification guidelines should be used on all IFE and PES system certification projects:

- 1) The IFE system should be connected to an electrical bus that does not supply power to airplane systems that are necessary for continued safe flight and landing. In-flight entertainment system designers should be encouraged to select lower level electrical busses (e.g., utility, galley, ground service bus, etc.).

NOTE: There is not a regulation that directly prohibits the powering of miscellaneous, non-required systems (in this case IFE) from busses that also power essential or critical level systems. However, the desire is to power IFE systems from busses that power other miscellaneous, non-required systems. As an example, the most reliable busses supply power to the most critical systems, whereas those busses that are the first to be shed (either manually or automatically) supply power to systems such as galleys, telephones, in-seat power supply, and IFE systems. The higher level busses are the last to be shed, if at all. Therefore, connecting an IFE system to an essential or critical level bus without a dedicated means to remove power inhibits the ability of the crew to remove power from the IFE system when deemed necessary (e.g., in a smoke/fumes emergency).

System reliability is another issue to consider. In-flight entertainment system wire bundles and components (exposed in some cases) are present throughout the passenger cabin. Thus the potential for system faults is increased by the wide exposure to varying hazards (e.g. pinched wires in the seat track, passengers stepping on or kicking the seat electronic box, spilled liquid, etc.). Since an IFE system has greater exposure to hazards, its potential to adversely affect other systems necessary for safe operation {reference 14 CFR section 25.1353(a)} is increased if it is connected to a bus powering systems required for continued safe flight and landing.

- 2) A means should be provided for the crew to disconnect the IFE system from its source of power. The removal of power should occur as close to the bus supplying power as possible. The disabling/deactivating of component outputs is not considered an acceptable means to remove power (i.e., disabling/deactivating the output of a power supply, seat electronic box, etc., as opposed to removing input power to the system).

NOTE: In this case, “crew” is referring to either the flightcrew or cabin crew. Although the flightcrew should have easy access to the means of disconnecting the power (i.e.,

without leaving their seats), each combination of an IFE system with a particular airplane model is unique and must be evaluated as such. It may be acceptable to provide the cabin crew with the means to remove power rather than the flightcrew.

3) Reliance on pulling system circuit breakers (CB) as the sole means to remove IFE system power is not acceptable. The use of CBs as a switch will degrade the CBs ability to trip at its rated current trip point. Also note that for some IFE systems, CBs are not accessible during flight (e.g., located in the electronics bay), or require the flightcrew to leave their seat to locate and pull the appropriate CBs.

4) Although incorrectly rated and coordinated CBs were not found to be an issue during the reviews, as with any wiring, IFE system wiring must be protected by appropriately rated and coordinated CBs.

5) The design and installation of the IFE system should be such that impact upon operational procedures is minimized. However, the airplane flight manual (AFM) must address any changes to normal, non-normal, and emergency procedures that are due to the installation of the IFE system. If IFE system power removal is accomplished by the cabin crew, then the cabin crew procedures should contain the appropriate information regarding power removal. Also, the AFM should be appropriately amended to inform the flightcrew that IFE system power removal is accomplished by the cabin crew. Revisions to the AFM should be coordinated with the flight test branch of your organization, and with the Aircraft Evaluation Group.

6) If the IFE system includes seat mounted equipment, the STC applicant is accountable for the certification of the entire IFE system, including the seat mounted equipment. As a reminder, TSOs C39 and C127 do not contain electrical requirements. Therefore, electrical aspects of the IFE components are not addressed under the TSO. In addition, many TSO holders disclaim the basic production and certification of the IFE parts. Therefore, it should not be assumed that electrical components have been addressed, in any way, under the TSO. If the components are addressed under the TSO, the approval is limited to the structural retention of the electrical component under dynamic test conditions required by the TSO. Further information regarding seat mounted IFE equipment can be found in the AIR-100 policy memorandum Policy and Guidance on the Approval of Electrical Components on Aircraft Seating Systems, dated October 27, 1998, which is in the process of being updated.

Other areas of concern were also identified during the STC reviews which include:

- insufficient certification data to adequately comply with 14 CFR Section 21.31, including lack of sufficient detail on installation instructions and drawings,
- inadequate or missing requirements for maintaining system separation,

- failure to produce Instructions for Continued Airworthiness (ICAW) which are in accordance with the requirements of 14 CFR section 25.1529 (Note: ICAW must be coordinated with AEG),
- inadequate consideration of the airplane manufacturers design philosophy when designing the installation of the IFE system, and
- failure to prepare an adequate electrical load analysis which is required by 14 CFR section 25.1351

Questions regarding this interim policy should be directed to Mr. Stephen Slotte, Airplane and Flightcrew Interface Branch, ANM-111. Mr. Slotte's telephone number is (425) 227-2315.

signed by
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for
John J. Hickey

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